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ABSTRACT

A process of formative evaluation which considers moral, scientific, and social values as its criteria and which is conducted by project staff is proposed for the evaluation of educational television (ETV) programs produced by the South African Broadcasting Corporation. The theoretical framework of ETV evaluation is outlined in the first section, and relevant literature on formative evaluation, pilot programs, learner verification and revision, self-formative evaluation, needs assessment, and content analysis is reviewed. The second section discusses cognitive, affective, and media criteria for ETV evaluation and outlines the positions of a number of authors (including Scriven, Mager, Tyler, and Eisner) on the source of criteria for evaluations. The third section discusses the possible roles of in-house staff, teachers, and experts on the evaluation team. ETV formative evaluation activities for each of the ETV development stages are outlined in the final section. (60 references) (GL)

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FORMATIVE EVALUATION OF ETV PROGRAMMES

BY

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Paper submitted to the Distance Education Conference,
Pretoria, May 1987

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C O N T E N T S

1. Introduction

2. Theoretical Framework

   2.1 Formative Evaluation
   2.2 Pilot Programmes
   2.3 LVR
   2.4 Self Formative Evaluation
   2.5 Needs Assessment
   2.6 Content Analysis

3. Criteria For ETV Evaluation

   3.1 Educational Criteria Sources
   3.2 Cognitive Criteria
   3.3 Affective Criteria
   3.4 Medium Criteria

4. Who should be involved in the Formative Evaluation Process?

   4.1 In-House Staff
   4.2 Teachers
   4.3 Experts

5. The ETV Formative Evaluation Process

6. Conclusions

FORMATIVE EVALUATION OF ETV PROGRAMMES

Aliza Duby

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Introduction

This paper attempts to explain the unique characteristics of each of ETV's development phases. It also suggests what kind of evaluation activities could and should be carried out parallel to these development activities and who should participate in the evaluation process. In addition, it explores the crite-tria for this evaluation.

The paper suggests employing the Self-Formative Evaluation approach (Duby, 1985). It follows that ETV developers and in-house evaluators working as evaluation-development teams using cognitive, affective and moral criteria improve the programme impact and the staff performance in one.

Figure 1 shows the distinguishable phases of the programme development.

Figure 1 : ETV developmental stage

ETV Phases of Development		ETV Stage of Development
I.	Preparation	1. Idea 2. Rationale
II.	Development	3. Content 4. Script
III.	Production	5. Production of pilots 6. Full-scale production

Theoretical Framework

Formative Evaluation

"Without a careful integration of formative evaluation activity, instructional development is nothing but an art form, an invention, usually with poor marks in aesthetics". (Nathenson, 1980, P.11)

Empirical reseach into the usefulness of formative evaluation studies was carried out by Abedor (1972), who defined formative programme evaluation as an attempt to answer three questions:

how to identify weak points in a programme using data collection;

how to analyse these data to develop revised hypotheses;

how to design and evaluate revisions.

Markele (1967) demonstrated the merits of trying materials in their draft stage with a single or a few learners using non-control-group design.

Cronbach (1963) emphasised the need to analyse the draft of an instructional programme, to provide the developers with evaluative evidence during the development process. His reason:

> "Evaluation used to improve the course while it is still fluid, contributes more to improvement of education than evaluation used to appraise a product already placed on the market".
> (Cronbach, 1963 : 675)

He also proposed to examine the effectiveness of segments of a programme rather than the "course as a whole" in order to identify "places where the course could be strengthened".

According to some researchers (Mann, 1969; Werner, 1980) expert judgement is conspicuously absent from evaluation reports. Nevertheless, the formative evaluation of "Sesame Street" and "3-2-1-contact" relied heavily on expert opinion (Cook and Curtin 1985; Palmer 1978). However, Cook and Curtin (1985) claimed that the adaptation of the CTW model by ES-TV was very poor partly because it did not include expert opinion.

Alkin (1974) focused on the testing of individual components of a programme as a typical formative evaluation activity. He added some more features of formative evaluation studies :

their design is explanatory and flexible; they emphasise interactive processes, make use of a variety of research instruments and do not use comparative

studies.

As summarised by Natenson (1980 P.28):

> "Formative interim evaluation provides feedback to the developer at the stage when he is working with pieces of a product which is not yet fully assembled. This may involve critical appraisal of the materials - by the developer himself and by his immediate colleagues and various outsiders such as specialists in instructional design, experts in the technical aspects of the medium through which the materials will be presented, and teachers who may be using the final materials".

Cook, Appleton, Conner, Shaffer, Tamkin & Weber (1975), dealing with the experimental formative evaluation of "Sesame Street" programmes, defined formative evaluation as being typically concerned with a low level of generalisability. They said generalisability was not as important in formative research as was the rate of feedback. Audience-oriented research is usually limited to groups of recipients with specific characteristics such as age, intelligence, interests, socio-economic background and other viewers' past experience (Sturm and Jöng, 1981) and is thus also characterised as nearly generalisable. Although they gather infromation from other relevant evaluation reports, the formative evaluator always has to conduct specific formative evaluation for a given programme in order to ensure the success of its unique objectives and nuances.

Formative Research has much in common with formative evaluation and is usually applied in the context of developing ETV (Nathenson, 1980), but is excluded from this study because it adds to formative evaluation the dimension of formulating the generalisability of hypothesis, whereas this study concentrates on pragmatic and practical evaluation. Formative research is also conducted solely by the researcher whereas formative evaluation emphasises in-house team work. The main purpose of formative research is to collect data systematically from audience tests in order to evaluate progress towards the achievement of objectives that have been clearly identified in advance (Palmer, 1974), whereas this paper suggests that objectives that emerge during the ETV development should also be considered.

Pilot Programmes

Another type of formative evaluation is the try-out study. This is the testing of a short programme or segments of programmes on a sample of the target audience. This process is widely used among ETV production companies and is mentioned by many researchers such as Baggaley and Duck (1976), Land (1972), Lesser (1974), Mates (1980), Nickerson (1979), Palmer (1978) and Tidhar (1979).

It is worth pointing out that although the test studies brought the CTW success, some production houses failed to implement the CTW model. This was because their investigation focused on pilot programme test studies rather than on the continuation and re-iteration of formative evaluation activities during the development stages of one programme (Cook and Curtin, 1985).
The CTW model is shown in figure 2.

Figure 2 : Formative Evaluation - The CTW Model

Formative Evaluation Activities
1. Pre-Production Phase
1.1. Experts conduct needs analysis and hammer out detailed behavioural objectives linked to the founder's definition of the educational problem to tackle.
1.2. Executive producer and experts agree on behavioural objectives.
1.3. Producers and other production staff are hired for their proved creative skills and their willingness to work with researchers.
1.4. Researchers and experts develop production philosophy and format.
2. Preliminary Production
2.1. Internal researchers conduct formative evaluation (laboratory style) on comprehensibility and appeal of segments to viewer population and modification of segments.
2.2. Pilot show (one or more) is produced to estimate the audience appeal and comprehensibility (interview, questionnaire, mechanical) and to select best pilot programme and best features.
2.3. Discussing the findings : informal, supportive, teamwork.
3. Production
3.1. Full-scale production, which receives permanent feedback from researchers and experts.

Cook and Curtin (1985) summarise five reasons for the success of the CTW model:

a. The funding of long pre-broadcast periods in which "needs analysis is conducted, objectives are made explicit, initial plans are critiqued, and pilots are produced, tested and modified". (P.95)

b. The establishment of co-operative teams in which producers pay close attention to formative researchers and subject experts and use their advice when making programme decisions.

c. Producers continue to pay attention to formative evaluation feedback during the full production phase.

d. "Formative researchers and content experts are useful so that, without them, the pedagogic or artistic quality of production would be less." (p. 95)

e. The fifth assumption deals with the guarantee of high quality and the acceptance by the target audience of pilot programmes produced with formative evaluation.

Two innovative features of formative activities used in the CTW model should be emphasised:-

a. re-iterative formative evaluation feedback;
b. continuity of in-house staff involvement in the formative evaluation/ development process.

The two features not only contribute to the immediate and continual improvement of the product, but also to the immediate and continual improvement of of the staff involved.

Learner Verification And Revision

Learner Verification and Revision imply that the learning effectiveness of a programme will be improved if it is taken through a cycle of try-outs with a sample of the target audience, by revision based on the feedback (Nathenson, 1980). It thus does not include all formative evaluation activities (as defined by Scriven, 1967); it is actually included in the "try-out" activities and also carried out summatively (but formatively oriented), as long as the programme has "market life" (Komoski, 1974). Some researchers proved in their intensive, imperical television research (Groppen and Lumsdaine, 1966, and Fleming, 1963), that in cases of revised television programmes based on try-out studies the performance level of viewers was raised by 20 - 30% over the original.

Later researchers (e.g. Nathenson, 1980; Baker, 1970) argue with these results since the abovementioned researchers tested the original against the revised versions. By doing that they did not prove that revised programmes based on try-outs improve programmes more than revised programmes based on, for example, the producer's intuition.

Self Formative Evaluation

Self-formative evaluation of instructional media during their development can be carried out in addition to the internal evaluation (Lewy, 1985 b) by users or developers of the programme jointly (Duby, 1985 b).

It is not to be confused with Self-Evaluation which has a phychotherapeutic contingent. It is also different from evaluation conducted by an outside researcher.

Abedor (1972) proved that the quality of a developer's work gradually improved after his work was submitted to formative evaluation. Abedor also showed that after a learning period during which three or four units from a particular developer were scrutinised and revised, the developer reached a level where only small revisions of the drafts were needed.

The aspect of the Self-Formative Evaluation is that "television producers do not generally seem to involve themselves directly in evaluation activities". (Nathenson, 1980, p. 29)

Closer contact between developers and evaluators and the possibility of simultaneous planning of development and evaluation activities and the self improvement effect are the main features of self-formative evaluation (Duby, 1985 b).

The advantages of using self-evaluation in the formative evaluation of ETV are summarised here by Duby (1985 b):

a. Self-evaluation reduces the threat associated with the activities of an external evaluator.

b. An individual who has carried out self-evaluation activities tends to show openness to evaluation carried out by others.

c. Self-evaluation increases awareness of the benefits that may be gained by the evaluation.

d. The party carrying out the self-evaluation has first-hand knowledge of the actual evaluation needs and is familiar with the context variable, which may effect the validity of the findings.

e. Self-evaluation carried out jointly by developers and users strengthens communication between them.

f. Self-evaluation is a powerful tool for self-improvement.

g. The producer, who also functions as an evaluator, is constantly informed about the evaluation results and is able to make decisions to improve the programme.

h. The user himself is involved in the evaluation and is therefore better motivated to play an active role in producing educational TV programmes.

i. Information obtained from "formative evaluation" is assimilated into the production process quickly.

j. The involvement of the ETVP developer and ETVP user in the production ensures the maximum suitability of the programme to fulfil its intended purpose.

k. An ETVP evaluated in its early stages will cost less and will be produced faster than an ETVP evaluated in later stages of production.

It will be of interest to compare programmes based on Learner Verification and Revision to programmes based on Self-Formative Evaluation and Revision.

Needs Assessment

Kaufman and English (1979) define need as a gap between current outputs or outcomes and desired outputs or outcomes. The needs assessment process is to determine the gaps between the existing and the desired and to put them in priority order.

Cook & Curin (1985) summarise needs assessment research as the attempt to determine:-

- what the target audience should understand to master the content of a certain programme;

* what needs have already been met;

* the discrepancies between the desired targets and actual conditions.

Scriven (1981) alerts the researcher to the confusion between necessary needs and desired ideals, although: "True needs are considerably harder to establish than felt wants, because true needs are often unknown to those who have them - possibly even contrary to what they want". (p. 101) Thus, he suggests, "drop the use of ideal level as the key level in the definition of need" (p. 102), instead using the necessary level. Necessary needs are facts that need to be fulfilled for a certain target audience, in order to avoid bad results, putting aside what they want or what they think they need. He also points out that the needs should be determined in terms of performance needs and not by treatment needs.

It follows that the role of the ETV formative evaluator, as early as the planning stage, is to identify the assessed needs and to examine the feasability of fulfilling them by producing a suitable TV programme. In order to reach the target audience it is the evaluator's task to identify the treatment that will enhance achievement, eg. by matching ETV programme's content with the target audience needs.

The results of needs assessment can be used later in the formative evaluation process when "reference criteria" emerge. The evaluator can measure the

the beneficial quality of such objectives using the assessed needs as a yard-stick.

Content Analysis

Content analysis is defined by Scriven (1981) as "the evaluative or pre-evaluative process of systematically determining the characteristics of a body of materials". (p.31)

The techniques for this evaluation process are mainly : counting frequency of certain kinds of words; analysing the plot in order to determine balanced appearance of certain images, e.g. males, females, children, robots, blacks or whites etc; monitoring reinforced main ideas or main objectives against side issues, etc.

Its main use is to ensure that the right learning effects (pay-offs) accrue as a result of exposure to the right amount of selected effects. Thus content analysis can result in content validity which indicates whether the content appears to meet all requirements for congruence between claimed and actual content, only claimed requirements and/or meets unclaimed objectives.

For example, a TV programme teaching basic scientific concepts was planned, aimed at pre-school children ("Ziki Zikombot", 1985, M Landers, Manager). Research taught us that in order to influence the retaining of concepts by this target audience it was advisable to repeat the message by verbal or visual techniques. (Rydin, 1973) The evaluator counted how many times each of the main concepts appeared in the script. It was found that the 'round shape' and 'the sun is made of fire' were repeated verbally in the script and that the 'round shape' was reinforced again by visuals in the pilot programme. 'What the moon is made of' was not repeated. The post viewing data revealed that the children knew what was 'round' and 'what the sun is made of' but could not remember 'what the moon is made of'.

Criteria For ETV Evaluation

Educational Criteria Sources

Scriven (1974) suggests that for each educational project a "Production Evaluation Checklist" (p. 7) should be compiled.

The status of every item in that checklist can be expressed by saying that each is "desiratum" and some items are "necessitata" ... "Each of these conditions must be met to have impeccable ground for a conclusion of merit for an educational programme". (p.8)

Formalisation of educational objectives does not occur in vacuo, disconnected from reality, but is a result of socio-cultural-economic factors and should reflect the values and principles of a given society (Postlethwaite, 1977).

Tyler (1950) was the first to establish a framework for the compilation of this "checklist".

Tyler mentions three sources for educational criteria:

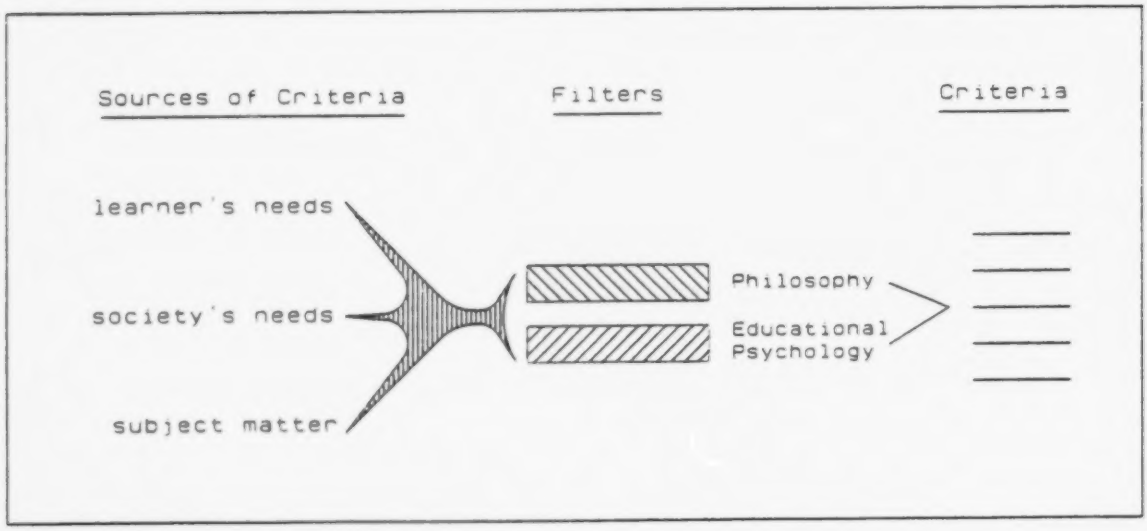
the society;

the learner's needs;

the subject matter.

He says there are two filters for the final selection of objectives: philosophy and education psychology (Tyler 1950). Tyler's model can be schematically represented as follows:

Figure 3: Tyler's Model



Many researchers oppose Tyler's approach. Eisner (1979) for example, gives reasons against pre-specification of objects for curriculum planning:

- The teaching process is dynamic and complicated and results in a variety of outputs that are difficult to predict and therefore impossible to prescribe as objectives.
- A desired action or determined content may be the basis for an educational programme and not necessarily a final determined objective.

Domingo (1979) said that one must be aware that the determined objectives do not contain all that can be achieved by the learner using that programme.

In stating this, they formulated the fundamentals for those who believed in the freedom of the educationalist to act spontaneously and not be imprisoned by predetermined educational objectives.

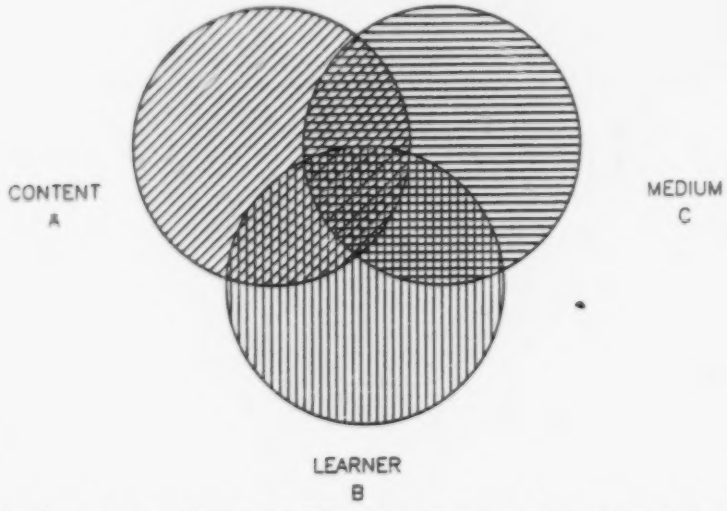
Mager (1975) and Scriven (1974) enriched the criteria for the evaluation of an educational product by suggesting an additional approach for the selection of the criteria, which Mager (1985) termed as "reference criteria" and Scriven (1974) as "goal-free evaluation".

"In this approach, the evaluator would make a deliberate attempt not to be co-opted by the rhetoric of programme goals". (Scriven, 1974, p. 179) Accordingly the evaluator uses the evaluation subject as source of criteria, regardless of the stated goals. He identifies issues that exist in the educational needs ("or producing educational or personal harm") (p. 179).

Consequently it is the evaluator's role to rephrase the objectives as they occur. In our model the last stage at which objectives can still be changed is the stage labelled "content". New objectives arising in the script stage should be identified, phrased and examined. However, they should be limited in amount or avoided to prevent an endless development process.

Three elements are joined to create an instructional TV situation (Duby, 1985 b): the content, TV features and viewer characteristics. The three components are presented in figure 4.

Figure 4: Overlap model of three components.



Criteria for the analysis of ETV programme will therefore stem from the three zones. The "learner" component is further divided into cognitive and affective factors (Bloom, 1976) and also concerns the unique needs of particular learner groups (Guillford, 1959).

The criteria for evaluating the content refer also to two behavioural domains: the cognitive and the affective.

Criteria for evaluating the medium stem from the same two domains as well as from the unique qualities of TV.

Cognitive Criteria

Cognitive criteria are clustered by Taba & Hills (1965) in two groups: lower mental functions and higher mental functions. Low mental activities include knowledge of information and the recall of information.

Bloom (1956) divides mental function of high order into five categories in the following hierarchy: comprehension of the message; application of the message to solve problems; analysis of the message in order to identify its components and the relationships between them; synthesis of the analysed components to create something new based on these components; and evaluation of the message according to standards.

Cognitive criteria from another point of view may be drawn from Piaget's theory (Piaget 1952, 1957). He says that the first thinking skills born in the human mind are elements of concrete thinking.

One can refer to concrete thinking manipulation abilities in 2 to 5 year old children. The concrete thinking gradually develops into abstract thinking (the way adults think) via generalisation of concrete elements in 6 to 9 year old

children.

Sturm and Jöng (1981) researched the information processing ability of 5 to 7 year olds reacting to verbal and pictorial stimulus of a TV programme and found that indeed in this 'intuitive stage' (Piaget term), visualisation of verbal information is more effective than merely verbal information, and visual information accompanied by verbal information is more effective than merely visual information. And detailed commentary is more effective than simple commentary. This indicates that to achieve more effect on the children's comprehension, more commentary is required in ETV for this age group than for older children; commentary that will provide narrations not only for those aspects of the programme that are not directly self-evident from the pictorial material.

They also found some differences between the 5, 6 and 7 year olds.

The 6 and 7 year-old children are more able to form appropriate images from what they hear, than the 5 year olds who need more verbal reinforcement of verbal information. "The younger children rely more on verbal cues which direct their attention". (This addition does not interfere with the comprehension of visually depicted events by the older children.)

They also found that format of presentation is supposed to be "consistent with the criteria which characterise the stage of intuitive thought" (p.61), i.e. in an orderly sequence.

If the cognitive capacity of this age group is taken into account, this age group (5 - 7) is able to comprehend even relatively long programmes.

Simultaneous analysis of the ETVP potential and of target audience abilities will provide the researcher with data concerning the programme's cognitive suitability for a certain audience. For example, the concrete-abstract elements in the programme should be analysed and matched with the viewer's ability. This is why one can produce a TV programme aimed at pre-school children, who may find a book too abstract a learning instrument (Minowich 1966).

Affective Criteria

The power of TV as an instructional medium lies in its ability to influence viewers' attitudes. Criteria from that field should thus be employed in evaluating whether the ETVP consists of such values and whether they match the objectives of the instructor.

Bloom (1976) identified five categories in the affective domain in the following hierarchy:

receiving (attending and reacting);
responding (active);
valuing - commitment to certain values and sustained interest;
organising - looking for a conceptual explanation.

Medium Criteria

Although TV production is a technically complicated process (Creaser 1981; McVaught 1979; Stephen 1975) it is very easy for the viewer to explore.

Wasche (1966) suggests a technical criterion:

- What knowledge is needed about technical aspects of TV and TV equipment to be able to use the TV as an instructional tool?

Since the technical characteristics of a programme or its format influence the understanding of the individual viewer, they should be watched and be evaluated (Baggaley 1980, Burke et al, 1981; Paluzzi, 1980)

Aversa and Forman (1978) describe the UMA model that is based on three categories of criteria, namely content, design and aesthetic quality".

Content Criteria, such as:

Is the content important?
Are there content errors?
Are there ambiguous content areas?
Is there an appropriate amount of content?
Does the programme present interesting and challenging ideas?

Design Criteria, such as:

Is the programme well organised?
Is the information clearly presented in the programme?
Are too many or only few topics treated?
Does the programme develop the main points adequately?
Are the main points well visualised?

Production Criteria, such as:

Is the voice-over technique used effectively?
Are existing stills and footage put to good use?
Is there continuity between sequences?
Are the sequences in appropriate length?

Coldevin (1975, 1976) sub-divides the production criteria to:

Technical variables, i.e.:

camera angle, close-ups, setting, lighting effects, sound effects, selection of colours, etc. To these Burke; Dowalibly and McKee (1981) add editing techniques such as cuts, linking shots, sequencing of shots, etc.

Format, i.e.:

opening or closing, packing (does the target audience see it as too fast, too slow, or correct) (Baggaley, 1980), built-in repetitions (Rydin, 1973). Burke et al (1981) suggest criteria such as the relation between verbal and visual density of information, and whether the educational message is salient.

Performing variations, i.e.:

performer's age, sex, eye contact level, etc.

Salomon differentiates "between the factors according to their effect on learning: the technology involved, the content transmitted and the symbolic codes in which the message is coded". (1976:25) He conceptualised TV as having its own symbolic codes and says that "It is the code into which TV is coded that makes the largest and most important difference in learning". (p. 26)

The learner must therefore familiarise himself with these TV codes in order to "translate" the message transmitted into a meaningful cognitive message. The

knowledge acquired from each use of a different code is different in amount and content. He found, for example, "that children viewing the version which emphasised close-ups acquired more knowledge pertaining to the relationship between parts or wholes". (p. 26)

The close-up technique can develop cognitive skills of analysing and differentiation in the viewer. It can also be used for emphasis.

One should therefore test an educational programme on issues such as : does the close-up emphasise an important element (from the educational point of view) or does it distract the viewer's attention to a side issue? If the differentiation between two elements is the educational objective of a programme, is the close-up used to help the viewer distinguish between the two?.

Salomon found that "children viewing the version which entailed logical gaps excelled in their comprehension of the plot's logical structure and continuity". (1976:26) Such planned and unplanned gaps can serve as educational criteria as well. Other similar criteria include the use of humour in the programme, drama effects, use of colour (Clements, 1984) etc.

"One of TV's major advantages is its capacity to overtly and explicitly show a process, a transformation ..... TV alone can visually show a transformation which is analogous, or ever similar, to what ought to take place in our minds". (Salomon 1976) The evaluator can therefore examine whether the programme is about a process or a static situation and can conclude accordingly what to show in the TV programme and what to leave for books and other static aids.

Lesser (1977) and Cook and Curtin (1985) pointed out that the "Sesame Street" programmes, which imitated the pace of American TV advertisements, probably caused hyperactivity, short attention spans and lack of interest in later slower-pace class activities in young viewers. This crucial statement was heavily criticised (Anderson, 1985). Still, the pace of a programme can be tested with target audiences to establish acceptability and popularity, but a criterion has not yet been established to say what pace a TV programme should have.

Who Should Be Involved in the Formative Evaluation Process

In House-Staff

The more members of in-house production staff are involved in the evaluation process, the more they reveal openness to evaluative recommendation, and the more they are capable of improving their own professional expertise and understanding and applying better evaluation results (Duby, 1985 b).

In researching the feasibility of carrying out self-formative evaluation at the SABC (Duby. 1985b), the willingness and ability of in-house staff (production team and internal researchers) to carry out evaluation activities was tested.

The subjects included three types of specialists : TV managers, producers and internal researchers. The collected data revealed that approximately 85% of the respondents showed a positive attitude towards formative evaluation.

Answers to the question "Who should be involved in the evaluation process?" are presented in the following table.

PERSONS TO BE INVOLVED	RESPONDENTS MANAGERS (n=3)	PRODUCERS (n=4)	RESEARCHERS (n=5)	TOTAL (n=12)
1. Manager	3	2	1	6
2. Producer	2	4	4	10
3. Internal Researcher	3	4	5	12
4. External Evaluator	3	0	0	3
5. Subject Matter Expert	3	3	1	7
6. Educator (Expert)	2	3	1	6
7. Psychologist (Expert)	1	0	1	2
8. Educational Practitioners	2	1	4	7
9. Target Audience Reps.	2	2	4	8
Maximum = n x 9	27	36	45	108
TOTAL	78%	53%	47%	

Table 1: Response to the question on people who should be involved in Evaluation (Duby, 1985 b)

The interpretation of the table is as follows:

a) Each group of professionals is inclined to emphasise its own role in the process of evaluation, i.e. all managers delegate themselves the evaluator's role while only 50% of the producers and 20% of the researchers delegate this role to managers.

b) Managers unanimously indicate willingness to co-operate with internal re-seachers, internal evaluators, external evaluators and subject experts. The producers grant such credit unanimously only to internal researchers, while their openness to external experts is partial.

c) The researchers are even more "self-oriented". At the same time researchers value the target audience's appreciation of a programme and educational practitioners' opinion, more than the production team does.

d) Managers (78%) are more willing to involve professionals of other specialisations in the evaluation of their programmes than producers (53%) and researchers (47%).

In the same study the TV professional's ability to conduct self-formative evaluation of TV programmes was examined.

They were asked the evaluate the content of the programme and the use of the qualities, to analyse the target audience and to evaluate the suitability of the programme to audience needs. The subjects evaluated the script before and after viewing the TV programme.

The data revealed that the TV professionals made meaningful judgement on the content of the script and to a minimum extent on the use of the medium.

They lacked self-confidence when dealing with learner characteristics and did not recognise the importance of concepts derived from educational psychology.

Nevertheless, by being involved in empirical studies, the producer had direct contact with his target audience, and also become more research-oriented and thus more open to criticism and self-improvement.

Teachers

Teachers are potential users of ETV, and because they know about the learner's needs, capabilities and attitude towards learning issues, they could be involved in the formative evaluation of scripts.

It was reported (Duby, 1985b) that teachers (pre-school and high-school teachers were tested) made a valid contribution to evaluating the content of the script. The collected data clearly indicated that the teachers felt comfortable making statements about the educational aspects of content and had a high level of self-confidence using terms derived from educational psychology (e.g. pre-requisite and taxonomic categories of educational objectives). They also showed competence in evaluating the match between learner characteristics and programme content but were less effective making evaluative comments about media characteristics and their match to the content.

Experts

As indicated previously managers, producers and researchers had different ideas about who should be involved in the evaluation process.

To create a valuable comprehensive and accurate programme, experts from other areas not yet discussed should be called in for advice during the production. These should include psychologists, educationalists, socialogists, experts in the relevant subject matter, technical experts in relevant inter-disciplinary fields, etc. (Cronbach, 1963; Leide, 1977; Lewy, 1973).

Nevo (1985) systematised the implementation of the "expert's tool" in the evaluation process and, by applying the system in formative evaluation research, demonstrated that the synthesised experts' opinion was perceived by the evaluation clients as very relevant information.

Nevo (1985) consigns two functions to the in-house researcher in this regard : to synthesise the expert's input and to sample the external experts to be invited to participate in the evaluation project.

Selection of experts should be based on their known academic and practical expertise. Their expertise should not stem from their formal qualification only; they should also be knwon for their credibility.

The advantages of expert input as an evaluation tool are summarised here :

- Expert contribution broadens the scope of the kind of information collected on each evaluation programme (Nevo, 1985).
- Expert opinion in the production stage gives one an extra constructional tool of evaluation (Duby, 1985a).
- It is an educational programme and its makers therefore cannot afford to expose its audience to mistakes. Experts can prevent mistakes (Duby, 1985 a).
- It is cheaper in terms of time and labour to employ experts than it is to try out a pilot or a final programme (Duby, 1985 a).
- Expert evaluation can help to detect problems in the early stage of

programme development (Lewy, 1973; Nevo, 1985).

- In the very early stages of production there is almost no other reliable method of evaluation.
- At early stages of programme development producers are still open-minded to criticism, but at later stages they are more concerned to justify what they have produced (Lewy, 1973).
- It is easier to manipulate the time schedule of experts than of an audience for experiments, observations and tests (Lewy, 1973).

The ETV Formative Evaluation Process

When only the idea of an ETV exists, one can examine whether there is a need for such a programme : Has the subject not already been covered by other teaching aids? Does the programme focus on the needs of a defined target group? What is the best presentation format (broadcasting, video cassettes, drama documentary etc) to produce this content for that audience?

Experts can refine the definition of the target audience and can provide data about its particular needs and abilities. The goals of the programme should be defined at this stage.

An analysis of cost effectiveness should also be conducted during the early stages of development. The prupose of this analysis is to determine the programme costs (which affect its potential effectiveness).

As a result of adequate needs-assessment research, cost analysis and expert advice, a rationale for the programme should be written. The evaluator has to see that the programme objectives are defined in the rationale.

Based on the rationale, the manager contracts the programme content writer. Experts on the subject are invited to provide information concerning content, educational objectives and their order of importance.

Subject experts continually provide the producers with advice and judgemental input about the scientific accuracy of the programme content. Educational specialists can also advise on the ability of the target audience to accept, absorb or use the ETV message.

In the 'content' and 'script' stages evaluators can test the documents and match the written script with the rationale and with the content, to ensure that scientific and behavioural objectives are treated and oriented correctly.

In the 'script' stage, criteria affiliated with the three sources (mentioned in figure 4) are already used, such as: suitability of the programme format to content, potential of the medium to fulfill the subject requirements, and suitability of a programme to target audience needs.

At this stage the evaluation team can be expanded. Duby (1985 b, c) showed that it is possible to collect valid and credible data regarding programme comprehension and acceptability from potential programme users such as teachers and TV professionals.

Production issues can be examined with viewers, only when a video cassette is available for viewing (Baggaley and Duck 1976; Van Vuuren, 1985; Cook and Curtin, 1985; Cook et al, 1975).

For this reason ETV production houses usually produce pilot segments or pilot programmes for previewing and formative evaluating (Baggaley et al., 1976; Cook and Curtin 1985; Cook et al., Tidhar, 1979).

For example: a pilot programme for the series "Ziki Zikombot", which attempted to teach 5½ to 7-year-olds basic mathematical concepts, was produced by the SABC ERTV. The producers thought that in addition to their target group they had an opportunity to capture other viewers and significantly increase the number of viewers. The pilot programme was therefore tested with a variety of potential viewers (Duby, 1985 c).

The study aimed to examine some production issues to ensure that the programme's salient points were not sacrificed by expanding the target age group. The pilot programme was therefore tested with a variety of potential viewers.

The oldest group (6 to 7) showed a great interest in the "real" material (EBE material) which was not attractive to the other groups. Although the group of 6 to 7 year-olds did not pay much attention to the "logo", the three younger groups were very interested and carried on watching the screen for as long as the "logo" was shown.

The data revealed that the programme was attractive and entertaining to children aged 3 to 7. The sets, acting, sound and visual effects were very well accepted by the 3 to 5-year-olds. The professor, scientific visuals and verbal information were well accepted by those aged 5 to 7.

The research conclusion was that it would probably be more effective for both teaching and entertaining to narrow the target audience to one age group (Duby, 1985 c).

Editing techniques are also the subject of formative evaluation in the later stages of the ETV development. In the abovementioned study for example, concepts that were emphasised in the ETV through verbal repetition and visual reinforcement were remembered by children after viewing, while the concepts that did not receive visual or verbal support were not remembered by the viewers.

The results reinforce the conclusion that by intentionally identifying concepts and deliberately repeating them with visuals and sound, it is possible to promote the viewer's comprehension and retention of educational elements. (Rydin, 1973).

The fact that the introduction of changes or corrections to material on video tape costs much more than correction on paper, leads on to conclude that the earlier the change is made, the cheaper it is.

As already discussed, in the early stages of producing a TV programme, paper work, brainstorm sessions and discussions take place. Because many people are

involved in the formative evaluation activities in these stages they are time-consuming, but are relatively inexpensive processes. One can spend up to 70% of the total development time on preparation activities whereas only 30% of the time is spent on real production. It was calculated that from one hundred percent (100%) of a budget allocated to the production of a programme, a maximum of 30% is spent on the first two stages. This includes experts' fees, script writing, correction of content and correction of script. Once the real production begins, the amount of money spent per stage increases and is used, for example, on the set, the shooting of the recording and tape editing (70% of the budget). Although the production stage is short, in this stage, time becomes a money factor as well, because the equipment, the set, television professionals and such are expensive resources that are paid for according to time, adding to the cost of these already expensive elements.

If the two measurements of time and money are combined, it is obvious that the earlier the production stage, the more time is available for evaluation examinations and the less money is spent on such rectifications.

In summary, when intensive and reiterative formative evaluation takes place in <u>early</u> production stages, the testing of preliminary TV programme segments and/or the testing of the pilot show can be limited mainly to production issues : presentation, setting, sound, acceptability of characters and editing techniques. But the rationale of the programme, its content, objectives, validity, suitability, accuracy and educational contribution should be researched in the <u>early</u> stages.

A model that presents the Formative Evaluation Activities in the ETVP development is shown in figure 5.

Figure 5 : ETV Formative Evaluation Activities.

ETV Stage	F.E. Activities
Idea	needs assessment coverage of subject defining goals defining the target audience selecting the format cost analysis cost effectiveness
Rationale	refining the target audience collecting experts advice defining objectives
Content	refining objectives putting objectives in order of importance content analysis comparison with rationale refining objectives definition (reference criteria) collecting input from experts
Script	interpreting experts' input (accuracy, acceptability, suitability) matching with 'content' and 'rationale' analysing TV technicalities matching content, medium and target audience collecting educationalists-users' advice
Pilot programmes	testing production issues and acceptability with viewers

Conclusions

As can be seen, the criteria become subjective and flexible measurements that are, in the case of the evaluation of television, extremely dependent on the technical ability of the producer.

The evaluator's technical understanding is such that he is able to relate an educational outcome to a technical quality.

We hope that Formative Evaluation, which considers moral scientific and social values as its criteria and which is conducted by its own staff, will increase the quality of the ETVP as well as its impact on its target audience.

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